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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,130	09/25/2003	Donald Frederick Lyons	DW0075 USDIV	7288

24199 7590 04/01/2005

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EXAMINER	
HU, HENRY S	

ART UNIT	PAPER NUMBER
1713	

DATE MAILED: 04/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/671,130	LYONS, DONALD FREDERICK	
	Examiner	Art Unit	
	Henry S. Hu	1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Election of February 22, 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) *1-11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-24* is/are rejected.

7)☒ Claim(s) *12* is/are objected to.

8)☒ Claim(s) *1-24* are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2 pages*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. It is noted that Applicants' election filed on February 22, 2005 was received. The Applicants have elected **Claims 12-24 (Group II) and the species (I) VDF without traverse**. **Claims 1-24 are now pending**, while the nonelected Claims 1-11 are withdrawn from consideration. It is also noted that this application is **a DIV of 10/193,435 filed on July 11, 2002, now US Patent No. 6,646,077**. An action follows.

Specification

2. The disclosure is objected to because of the following informalities:

On **page 6**, lines 12-13, the formula expression for chain transfer agent "$\mathbf{RI_x}$" may be improper. It is noted that R group is **a perfluoroalkyl when x = 1**; while R group is **a perfluoroalkylene when x = 2**. See page 9 at lines 13-23.

Appropriate correction is required.

Claim Objections

3. Claim 12 is objected to because of the following informalities:

On **Claim 12** at lines 2-3, the writing as "a first fluoromonomer selected from the group consisting of vinylidene fluoride and tetrafluoroethylene" is improper. **Only one monomer is used as a first fluoromonomer.** However, the use of Markush language may mean using **more than one monomer**. The examiner suggests the Applicants changing to "**a first fluoromonomer selected from vinylidene fluoride and tetrafluoroethylene**".

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. *The limitation of parent* ***Claim 12*** *in present invention relates to a curable fluoroelastomer composition comprising: (A)* ***a fluoroelastomer*** *comprising (i)* ***a first fluoromonomer*** *selected from the group consisting of* ***vinylidene fluoride and tetrafluoroethylene****; (ii)* ***at least one second fluoromonomer****, different from said first fluoromonomer; (iii)* ***0.05-4 wt%*** *of a cure site monomer of* $CH_2=CH-(CF_2)_nI$ *where n = 2-8; and (iv) 0.01-1 wt% of iodine bound at terminal positions of fluoroelastomer polymer chains; (B)* ***an organic peroxide****; and (C)* ***a coagent****. See other limitations of dependent* ***Claims 13-24****.*

6. Claims 12-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Bekiarian (EP 171,290 A2).

Regarding the limitation of parent **Claim 12**, **Bekiarian** discloses a curable fluoroelastomeric composition comprising: (A) a fluoropolymer such as a **tetrapolymer** of vinylidene fluoride (VDF), hexafluoropropene (HFP), tetrafluoroethylene (TFE) and 4-iodo-3,3,4,4-tetrafluorobutene-1 (ITFB), or a **terpolymer** of VDF, HFP and ITFB; (B) an organic **peroxide compound** such as 2,5-dimethyl-2,5-di(di-tertiarybutylperoxy)hexyne-3; and (C) a coagent such as **triallylisocyanurate** (see Example 1 at page 11, line 9 – page 12, line 21; see Example 2 at page 13, line 24 – page 14, line 21; see **fluoroelastomer** at page 2 at line 21; see **curable** on page 2 at line 20-21; also see abstract, line 1-16). Bekiarian further discloses the required ratios for each component in working examples. It is noted that the chemical structure of 4-iodo-3,3,4,4-tetrafluorobutene-1 (ITFB) is reading on $CH_2=CH-(CF_2)_nI$ where n = 2. With respect to the chain-end limitation on "(iv) 0.01-1 wt% of iodine bound at terminal positions of fluoroelastomer polymer chains", Bekiarian has disclosed the use of other iodo-containing compounds such as **methylene iodide (CH_2I_2) to be useful as a chain transfer agent in the copolymerization** (page 8, line 1-9; page 18, line 12). Therefore, Bekiarian anticipates the limitation of Claim 12.

7. Regarding **Claims 13 and 14**, calcium carbonate $CaCO_3$ is included in the above-mentioned examples (page 12, line 5).

Regarding **Claims 17-18 and 20-21**, Bekiarian has disclosed using a terpolymer of VDF, **a perfluoro-alkyl perfluorovinyl ether**, and ITFB (page 7, line 29-36).

Remaining dependent **Claims 15-16, 19 and 22-24** are thereby rejected with the same reason for the above rejections of Claims 12-14, 17-18 and 20-21.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 12-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tatemoto et al. (US 4,243,770) in view of Bekiarian (EP 171,290 A2).

Regarding the limitation of parent **Claim 12**, **Tatemoto** has disclosed a curable fluoroelastomeric composition comprising: (A) a fluorinated copolymer made from vinylidene fluoride (VDF), hexafluoropropene (HFP), and tetrafluoroethylene (TFE) in addition to an iodine-containing unsaturated monomer. Such an iodo-containing monomer has a general formula as **RI_x**, and it includes 3-iodoperfluoropropene-1 to be useful as a cure site monomer; (B) an organic **peroxide compound** such as 2,5-dimethyl-2,5-di(di-tertiarybutylperoxy)hexyne-3; and (C) a coagent such as **triallyl cyanurate** (abstract, line 1-15; column 2, line 56 – column 3, line 19; column 4, line 48 – column 16). With respect to the chain-end limitation on "(iv) 0.01-1 wt% of iodine bound at terminal positions of fluoroelastomer polymer chains", Tatemoto has disclosed that other diiodo-containing compounds such as 1,3-diiodoperfluoro-n-propane **to be useful as a chain transfer agent in the copolymerization** may be also included (column 3, line 8-11).

10. Although an iodine-containing unsaturated monomer such as 3-iodo-perfluoropropene-1 is used in making the copolymers, the Tatemoto reference is silent about specifically using a cure site monomer of **CH_2=CH-$(CF_2)_n$I** where n = 2-8. **Bekiarian** has taught that 4-iodo-3,3,4,4-tetrafluorobutene-1 (ITFB) useful as a cure site monomer, can be copolymerized with vinylidene fluoride, hexafluoro-propene and tetrafluoroethylene. The advantage is that such obtained fluoropolymers can be made into **a faster/tighter-curable fluoroelastomeric composition** with the combination of organic peroxide and a coagent such as triallylisocyanurate (see Example 1 at page 11, line 9 – page 12, line 21; see Example 2 at page 13, line 24 – page 14, line 21; see

fluoroelastomer at page 2 at line 21; see **curable** on page 2 at line 20-21; see faster and tighter curing at page 1 at line 9; also see abstract, line 1-16).

In light of the fact that both curable compositions produced by the involved references are containing almost the same components. It is noted that both references are using compound species from the same genus (iodo-containing compound) as a cure site monomer. Therefore, one having ordinary skill in the art would have found it obvious to **modify Tatemoto's curable composition by replacing 3-iodo-perfluoropropene-1 with 4-iodo-3,3,4,4-tetrafluorobutene-1** as taught by Bekiarian based on functional equivalence and interchangeability. One would expect all embodiments in the same genus would succeed. Additionally, one advantage is to obtain a faster and tighter curing.

11. The discussion of the disclosures of the prior art of Bekiarian **for Claims 12-24** of this office action is incorporated here by reference. With disclosures and teaching from both Bekiarian and Tatemoto in combination or alone, remaining dependent Claims 13-24 are thereby rejected.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The following references relate to a curable fluoroelastomer composition comprising

(A) a specific fluoroelastomer comprising a cure site monomer CH_2=CH-$(CF_2)_n$I, (B) an organic peroxide; and (C) a coagent:

US Patent No. **6,191,208 B1 to Takahashi** et al. disclose a **curable** perfluoroelastomer composition comprising (A) a perfluoroelastomer having units of TFE, PAVE and a nitrile-containing monomer, (B) a curing agent, and (C) anhydrous silica (abstract, line 1-7; column 1, line 50-62). The nitrile-containing monomers are 8-CNVE or the like, which are related to derivatives of perfluorinated vinyl ethers (column 2, line 60 – column 3, line 25). **No VDF and the claimed** cure site monomer of **CH_2=CH-$(CF_2)_n$I** is used in the copolymer at all. Therefore, Takahashi fails to teach or fairly suggest the limitation of present invention.

US Patent No. **5,384,374 to Guerra** et al. disclose a **curable** perfluoroelastomer composition comprising (A) a perfluoroelastomer having units of **VDF** and HFP, (B) a fluorinated ether composition comprising a functional fluoroaliphatic mono- or polyether curing agent, and (C) some curatives and additives (abstract, line 1-4; column 3, line 27-57; column 5, line 3 – column 6, line 57). Although VDF is used, **no cure-site monomer** is used in the copolymer at all. Therefore, Guerra fails to teach or fairly suggest the limitation of present invention.

13. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Henry S. Hu whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Henry S. Hu

Patent Examiner, Art Unit 1713, USPTO

March 28, 2005

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